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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/749,659	12/30/2003	Zhongze Wang	MI22-2477	9749

21567 7590 09/22/2004

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EXAMINER	
KENNEDY, JENNIFER M	

ART UNIT	PAPER NUMBER
2812	

DATE MAILED: 09/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/749,659	WANG, ZHONGZE	
	Examiner	Art Unit	
	Jennifer M. Kennedy	2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 July 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11 and 13-16* is/are rejected.

7)☐ Claim(s) *12* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *7/15/, 6/22, 12/30*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 11 and 13 are is rejected under 35 U.S.C. 102(e) as being anticipated by Kunikiyo (U.S. Patent No. 6,661,065).

In re claim 11, Kunikiyo (see column 26, line10 through column 28, line 60 and Figure 49) discloses silicon-on-insulator comprising integrated circuitry, comprising:

a substrate comprising a semiconductive silicon comprising layer (74) of the silicon-on-insulator circuitry the silicon comprising layer comprising a pair of source/drain regions (4) formed therein and a channel region (7) formed therein which is received intermediate the source/drain regions;

a transistor gate (90) received operably proximate the channel region;

an insulator layer of the silicon-on-insulator circuitry, received on the silicon comprising layer, the insulator layer comprising a first silicon dioxide comprising region, in contact with the silicon comprising layer and running along at least a portion of the channel region between the source/drain regions, a silicon nitride comprising region in contact with the first silicon dioxide comprising region and running along at least a

portion of the channel region, and a second silicon dioxide comprising region in contact with the silicon nitride comprising region, the silicon nitride comprising region being received intermediate the first and second silicon dioxide comprising regions (see especially column 28, lines 51-55, and column 26, line 5 through column 28, line 55).

In re claim 13, Kunikiyo discloses the circuitry wherein the silicon nitride comprising region runs entirely along the channel region between the source/drain regions see especially column 28, lines 51-55, and column 26, line 5 through column 28, line 55 and Figure 49) .

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kunikiyo (U.S. Patent No. 6,661,065) in view of Xiang (U.S. Patent No. 6,410,938).

In re claim 14, Kunikiyo discloses the device as claimed and rejected above, but does not disclose the device wherein the silicon nitride comprising region is formed to have a thickness of from about 10 Angstroms to about 50 Angstroms.

Xiang teaches that the silicon nitride comprising region is formed to have a thickness of from about 10 Angstroms to about 50 Angstroms (see Xiang column 3, lines 30-40).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the silicon nitride comprising region to have a thickness of from about 10 Angstroms to about 50 Angstroms in order to form an buried insulator layer having a reduced depletion (see abstract)

In re claim 15, neither Kunikiyo and Xiang teach the method wherein the first silicon dioxide comprising region is formed to have a thickness of from about 10 Angstroms to about 50 Angstroms.

The examiner notes that Applicant does not teach that the thickness range solves any stated problem or is for any particular purpose. Therefore, the thickness range lacks criticality in the claimed invention and does not produce unexpected or novel results. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the silicon oxide to a thickness of form about 10 Angstroms to about 50 Angstroms, since the invention would perform equally well when the insulating layer of the SOI substrate is formed to a different thickness and because it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller,* 105 USPQ 233, MPEP 2144.05 II A.

In re claim 16, Kunikiyo discloses the device as claimed and rejected above, but does not disclose the device wherein the source/drain regions extend to the insulator layer.

Xiang discloses the method wherein the source/drain regions (40, 42) extend to the insulator layer.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to extend the source/drain regions to the insulator layer in order to minimize the parasitic junction capacitance.

Allowable Subject Matter

Claim 12 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowance: the prior art, either singly or in combination, fails to anticipate or render obvious, the limitations including the silicon nitride comprising region runs along only a portion of the channel region between the source/drain regions in combination with the other limitations of independent claim 11.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Fung (U.S. Patent No. 6,642,579) discloses the advantage of forming the source/drain region extending to the insulator of a SOI substrate.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer M. Kennedy whose telephone number is (571) 272-1672. The examiner can normally be reached on Mon.-Fri. 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on (571) 272-1679. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jennifer M. Kennedy
Patent Examiner
Art Unit 2812

jmk